

## **REMARKS**

In the Office Action, the Examiner rejected claims 1-18 under 35 USC § 112, claims 1-5 and 7-18 under 35 USC § 102 and claims 1-2, 6-37 under 35 USC § 103. These rejections are fully traversed below.

Claims 1, 13-16, 19, and 37 have been amended. Claim 12 has been cancelled, and moved into claim 1. A few additional amendments have been made to claim 1 to improve its form. Claims 38- 54 have been added. Thus, claims 1-11 and 13-54 are pending in the application. Reconsideration of the application is respectfully requested based on the following remarks.

### ***ISSUES UNDER 35 USC 112***

**Claims 1-18 have been rejected under 35 U.S.C. §112 second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention**

It is believed that the rejection is overcome by the amendment made above, i.e., “said substantially cylindrical plasma processing” was amended to read –said substantially cylindrical plasma processing chamber--.

### ***ISSUES UNDER 35 USC 102 & 103***

**Claims 1-5 and 7-18 have been rejected under 35 U.S.C. §102(b) as being anticipated by *Li et al.*, U.S. Patent 6,070,551.**

In contrast to *Li*, claim 1 (and its dependents) specifically requires, “...said gas flow system comprising at least one gas inlet for receiving said input gas that is to be delivered into said plasma processing chamber and at least first and second gas outlets that are each capable of delivering said input gas to said plasma processing system, at least a portion of said input gas being delivered to said plasma processing chamber via said first and second outlets...” It should be noted that this element was moved from dependent claim 12 to independent claim 1. While *Li*

may disclose center nozzles 56 and nozzles 34/34a, *Li* does not teach or suggest receiving an input gas through a gas inlet and delivering a portion of the input gas to the plasma processing chamber via first and second outlets. In *Li*, an individual gas source provides a gas directly to individual nozzles 56, 34 or nozzle 34a. In particular, first gas source 35 provides gas to nozzle 34, second gas source 35a provides gas to nozzle 34a and third gas source 58 provides gas to center nozzle 56. None of these gases are delivered into separate first and second nozzles. That is, each gas source has its own dedicated nozzle. They don't supply gas to any other nozzle. Accordingly, the rejection is unsupported by the art and should be withdrawn.

The rejections to claims 2-5, 7-11 and 13-18 should also be withdrawn or at least the same reasons as above since these claims depend either directly or indirectly from independent claims 1. Even in lieu of this, it should be noted that the dependent claims require additional features that are not taught in *Li*.

**Claim 6 has been rejected under 35 U.S.C. §103(a) as being unpatentable over *Li* in view of *Wing et al.*, U.S. patent 6,277,235.**

The rejection to claim 6 should be withdrawn for at least the same reasons as above. That is, *Wing* does not overcome the deficiencies of *Li*. Neither reference teaches or suggests, "...said gas flow system comprising at least one gas inlet for receiving said input gas that is to be delivered into said plasma processing chamber and at least first and second gas outlets that are each capable of delivering the input gas to said plasma processing system, at least a portion of said input gas being delivered to said plasma processing chamber via said first and second outlets..." as required by claim 1 from which claim 6 depends.

**Claims 1-2 and 7-18 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Murugesh et al.*, U.S. Patent 6,228,781.**

In contrast to *Murugesh*, claim 1 (and its dependents) specifically requires, "...said gas flow system comprising at least one gas inlet for receiving said input gas that is to be delivered into said plasma processing chamber and at least first and second gas outlets that are each capable of delivering the input gas to said plasma processing system, at least a portion of said input gas being delivered to said plasma processing chamber via said first and second outlets..." Again, it should be noted that this element was moved from dependent claim 12 to independent

claim 1. While *Murugesh* may disclose nozzles 45 and 38/40, *Murugesh* does not teach or suggest delivering a portion of an input gas to multiple nozzles. Accordingly, the rejection is unsupported by the art and should be withdrawn. The Examiner is respectfully requested to show where such a feature is taught in *Murugesh* in order to maintain the rejection.

The rejections to claims 2, 7-11 and 13-18 should also be withdrawn or at least the same reasons as above since these claims depend either directly or indirectly from independent claims 1. Even in lieu of this, it should be noted that the dependent claims require additional features that are not taught in *Murugesh*.

**Claim 6 has been rejected under 35 U.S.C. §103(a) as being unpatentable over *Murugesh* in view of *Wing*.**

The rejection to claim 6 should be withdrawn for at least the same reasons as above. That is, *Wing* does not overcome the deficiencies of *Murugesh*. Neither reference teaches or suggests, "...said gas flow system comprising at least one gas inlet for receiving said input gas that is to be delivered into said plasma processing chamber and at least first and second gas outlets that are each capable of delivering the input gas to said plasma processing system, at least a portion of said input gas being delivered to said plasma processing chamber via said first and second outlets..." as required by claim 1 from which claim 6 depends.

**Claims 19-35 and 37 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Ueda* et al., U.S. Patent 5,810,932 in view of *Kadomura*, U.S., Patent 6,096,160 and further in view of *Li*.**

In contrast to all of these references, claim 19 (and its dependents) specifically requires, "... said gas flow system controlling the flow of input gas into at least two different regions of said plasma processing chamber, said at least two different regions including at least one peripheral region located at a side surface of said plasma processing chamber and at least one top region located at a top surface of said plasma processing chamber, said peripheral region being located closer to said upper end of said plasma processing chamber than said lower end of said plasma processing chamber." *Ueda*, *Kadomura* and *Li* are all silent to a gas flow system controlling the flow of input gas into at least two different regions of said plasma chamber. And even though *Li* may disclose nozzles 56, 34 and 34a, *Li* does not teach or suggest nozzles 34 and

34a that are located closer to an upper end of the enclosure than a lower end of the enclosure. As shown in Fig. 3 of *Li*, the nozzles 34 and 34a are located in a lower portion of the enclosure 6 proximate the substrate 20 rather than an upper portion of the enclosure 6 proximate the top 75. Accordingly, the rejection is unsupported by the art and should be withdrawn.

In contrast to all of these references, claim 37 specifically requires, "... said gas flow system controlling the release of input gas, associated with forming a plasma, into a first, a second and a third region within said plasma processing chamber, said first region being a top central region located at the top surface of said plasma processing chamber, said second region being an upper peripheral region located on an upper surface of said plasma processing chamber proximate said upper end of said plasma processing chamber, said third region being a lower peripheral region located proximate said lower end of said plasma processing chamber." *Ueda*, *Kadomura* and *Li* are all silent to a gas flow system controlling the release of input gas into three regions of said plasma chamber. And even though *Li* may disclose nozzles 56, 34 and 34a, *Li* does not teach or suggest nozzles that are located on an upper surface of the enclosure proximate the top of the enclosure. As shown in Fig. 3 of *Li*, the nozzles 34 and 34a are located at a lower end of the enclosure proximate the substrate 20, i.e., the processing area of the enclosure 6. Accordingly, the rejection is unsupported by the art and should be withdrawn.

The rejections to claims 20-35 should also be withdrawn or at least the same reasons as above since these claims depend either directly or indirectly from independent claim 19. Even in lieu of this, it should be noted that the dependent claims require additional features that are not taught in *Ueda*, *Kadomura* and *Li*.

**Claim 36 has been rejected under 35 U.S.C. §103(a) as being unpatentable over *Ueda* in view of *Kadomura*, and further in view of *Li* and *Wing*.**

The rejection to claim 36 should be withdrawn for at least the same reasons as above. That is, *Wing* does not overcome the deficiencies of *Ueda*, *Kadomura*, *Li*. None of these reference teaches or suggests the features described above with regards to claim 19 from which claim 36 depends.

**Claims 19-20, 23-30, 32-34 and 37 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Ueda* et al., U.S. Patent 5,810,932 in view of *Kadomura*, U.S., Patent 6,096,160 and further in view of *Murugesh*.**

In contrast to all of these references, claim 19 (and its dependents) specifically requires, "... said gas flow system controlling the release of input gas, associated with forming a plasma, into a first, a second and a third region within said plasma processing chamber, said first region being a top central region located at the top surface of said plasma processing chamber, said second region being an upper peripheral region located on an upper surface of said plasma processing chamber proximate said upper end of said plasma processing chamber, said third region being a lower peripheral region located proximate said lower end of said plasma processing chamber." *Ueda* and *Kadomura* are silent to a gas flow system controlling the flow of input gas into at least two different regions of said plasma chamber. And even though *Murugesh* may disclose nozzles 45, 38 and 40, *Murugesh* does not teach or suggest nozzles 38 and 40 that are located at an upper region of the chamber 13, i.e., they are located in the lower regions of the chamber 13. As shown in Fig. 1A of *Murugesh*, the nozzles 38 and 40 are located closer to the substrate 17 than the top of the chamber 13. Accordingly, the rejection is unsupported by the art and should be withdrawn.

In contrast to all of these references, claim 37 specifically requires, "... said gas flow system controlling the flow of input gas into at least two different regions of said plasma processing chamber, said at least two different regions including at least one peripheral region located at a side surface of said plasma processing chamber and at least one top region located at a top surface of said plasma processing chamber, said peripheral region being located closer to said upper end of said plasma processing chamber than said lower end of said plasma processing chamber." *Ueda* and *Kadomura* are silent to a gas flow system controlling the flow of input gas into at least two different regions of said plasma chamber. And even though *Murugesh* may disclose nozzles 45, 38 and 40, *Murugesh* does not teach or suggest nozzles 38 and 40 that are at different regions of the chamber 13, i.e., they are at the same level. See for example, Fig. 1B which shows nozzle 39 and 40 at the same level. In addition, *Murugesh* does not teach or suggest nozzles 38 and 40 that are located at an upper end of the chamber 13. As shown in Fig. 1A of *Murugesh*, the nozzles 38 and 40 are located closer to the substrate 17 than the top of the chamber 13. Accordingly, the rejection is unsupported by the art and should be withdrawn.

The rejections to claims 20, 23-30 and 32-34 should also be withdrawn or at least the same reasons as above since these claims depend either directly or indirectly from independent claim 19. Even in lieu of this, it should be noted that the dependent claims require additional features that are not taught in *Ueda*, *Kadomura* and *Murugesh*.

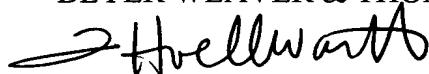
**Claim 36 has been rejected under 35 U.S.C. §103(a) as being unpatentable over *Ueda* in view of *Kadomura*, and further in view of *Murugesh* and *Wing*.**

The rejection to claim 36 should be withdrawn for at least the same reasons as above. That is, *Wing* does not overcome the deficiencies of *Ueda*, *Kadomura*, *Murugesh*. None of these reference teaches or suggests the features described above with regards to claim 19 from which claim 36 depends.

### **SUMMARY**

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,  
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## APPENDIX

1. (Amended five times) A plasma processing system, said plasma processing system comprising:

a substantially cylindrical plasma processing chamber used to process a substrate, said substantially cylindrical plasma processing chamber including a top region located on the top surface of said substantially cylindrical plasma processing chamber and a peripheral region located on a surface surrounding the periphery of said substantially cylindrical plasma processing **chamber, said substantially cylindrical plasma processing chamber including at least an inner wall; and**

a gas flow system coupled to said plasma processing chamber, said gas flow system controlling flow of input gas into at least two different regions of said plasma processing chamber; said input gas being a source gas suitable for use to etch said substrate in said plasma processing chamber[;]

**wherein], said at least two different regions includ[ing] at least one peripheral region and at least one top region of said plasma processing chamber[; and**

**wherein], said peripheral region of said plasma processing chamber [does] not includ[ing] any points of said top region of said plasma processing chamber, said gas flow system comprising at least one gas inlet for receiving said input gas that is to be delivered into said plasma processing chamber and at least first and second gas outlets that are each capable of delivering said input gas to said plasma processing system, at least a portion of said input gas being delivered to said plasma processing chamber via said first and second outlets.**

13. (Once Amended) A plasma processing system as recited in claim 1 [12], wherein the at least a portion of the input gas is released into a second region, the first region being a top central region within the plasma processing chamber, and the input gas that is released into the first region is delivered by the first gas outlet.

14. (Once Amended) A plasma processing system as recited in claim 1 [12], wherein the at least a portion of the input gas is released into a second region, the first region being an upper peripheral region that surrounds the inner wall of the plasma processing chamber, and the input gas that is released into the second region is delivered by the second gas outlet.

15. (Once Amended) A plasma processing system as recited in claim 1 [12], wherein the at least a portion of the input gas is released into a second region, the second region being a lower peripheral region that surrounds the inner wall of the plasma processing chamber, and the input gas that is released into the second region is delivered by the second gas outlet.

16. (Once Amended) A plasma processing system as recited in claim 1 [12], wherein the gas flow system receives a gas flow control signal for determining the amount or volume of the input gas that is delivered into the plasma processing chamber by each one of the first and second gas outlets.

19. (Amended four times) A plasma processing system for processing a substrate, comprising:

**a [substantially cylindrical] plasma processing chamber within which a plasma is both ignited and sustained for said processing, said plasma processing chamber having no separate plasma generation chamber, said plasma processing chamber having an upper end and a lower end; and**

**[a coupling window disposed at an upper end of said plasma processing chamber.**

**an RF antenna arrangement disposed above a plane defined by said substrate when said substrate is disposed within said plasma processing chamber for said processing;**

**an electromagnet arrangement disposed above said plane defined by said substrate, said electromagnet arrangement being configured so as to result in a radial variation in the static magnetic field topology within said plasma processing chamber in the region proximate said RF antenna when at least one direct current is supplied to said electromagnet arrangement, said radial variation being effective to affect processing uniformity across said substrate;**

**a dc power supply coupled to said electromagnet arrangement, said dc power supply having a controller to vary a magnitude of said at least one direct current, thereby changing said radial variation in said magnetic field topology within said plasma processing chamber in said region proximate said antenna to improve said processing uniformity across said substrate; and]**

**a gas flow system coupled to said plasma processing chamber, said gas flow system controlling the flow of input gas into at least two different regions of said plasma processing chamber, [said input gas being a source gas suitable for use to etch said substrate in said plasma processing chamber;**

wherein] said at least two different regions includ[ing] at least one peripheral region located [at region located on the] at a side surface [surrounding the periphery] of said [substantially cylindrical] plasma processing chamber and at least one top region located at a top surface of said [substantially cylindrical] plasma processing chamber, said peripheral region being located closer to said upper end of said plasma processing chamber than said lower end of said plasma processing chamber; and

wherein said peripheral region of said plasma processing chamber does not include any points of said top region of said plasma processing chamber].

37. (Amended four times) A plasma processing system for processing a substrate, comprising:

a [substantially cylindrical] plasma processing chamber within which a plasma is both ignited and sustained for said processing, said plasma processing chamber having no separate plasma generation chamber, said plasma processing chamber having an upper end and a lower end, said substrate being processed in said lower end;

a coupling window disposed at an upper end of said plasma processing chamber.

an RF antenna arrangement disposed above a plane defined by said substrate when said substrate is disposed within said plasma processing chamber for said processing; and

[an electromagnet arrangement disposed above said plane defined by said substrate, said electromagnet arrangement being configured so as to result in a radial variation in the static magnetic field topology within said plasma processing chamber in the region proximate said RF antenna when at least one direct current is supplied to said electromagnet arrangement, said radial variation being effective to affect processing uniformity across said substrate;

a dc power supply coupled to said electromagnet arrangement, said dc power supply having a controller to vary a magnitude of said at least one direct current, thereby changing said radial variation in said magnetic field topology within said plasma processing chamber in said region proximate said antenna to improve said processing uniformity across said substrate; and]

a gas flow system coupled to said plasma processing chamber, [wherein] said gas flow system control[s] the release of input gas, [suitable for etching the substrate] associated with forming a plasma, into a first [and a], a second and a third region within said plasma processing chamber, said first region being a top central region located at the top surface of said [substantially cylindrical] plasma processing chamber [and], said second region being an upper peripheral region

located on an upper surface [surrounding the periphery] of said [substantially cylindrical] plasma processing chamber proximate said upper end of said plasma processing chamber, said third region being a lower peripheral region located proximate said lower end of said plasma processing chamber. [; and

wherein said first and second regions do not have any points in common.]